



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,510	08/04/2006	Hiroshi Nishimura	294723US3X PCT	2077
22850	7590	08/30/2007	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.			CHAET, MARISSA W	
1940 DUKE STREET			ART UNIT	PAPER NUMBER
ALEXANDRIA, VA 22314			1722	
			NOTIFICATION DATE	DELIVERY MODE
			08/30/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	Application No. 10/588,510	Applicant(s) NISHIMURA ET AL.	
	Examiner Marissa W. Chaet	Art Unit 1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/29/06</u> . | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Specification***

The disclosure is objected to because of the following informalities: all references to claim numbers should be deleted, such as in paragraphs 21-25, 30 and 32.

Appropriate correction is required.

### ***Drawings***

The drawings are objected to because Figures 15-17 should be labeled as prior art. Additionally, Examiner does not see where radiator (49) is labeled in the drawings. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**1. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani et al. (US 3,817,710).**

Regarding claim 1, Mizutani discloses a single-crystal growth apparatus which comprises spheroid mirror (23), heat source (21) located at one foci (F1) of the spheroid mirror, a feed rod (25) and a seed crystal rod (24) located at the other foci (F2) of the spheroid mirrors, a quartz tube (35) surrounding the feed rod and seed crystal rod, and shaft drive (34) means for rotating and vertically moving (38) crystal draft shafts respectively supporting the feed rod and seed crystal rod, and in which infrared rays of the heat sources are reflected by the spheroid mirrors to irradiate the feed rod and seed crystal rod located at the other foci, thereby growing the crystal, which the apparatus is characterized in that the minor axis/major axis ratio of the spheroid mirrors is 0.9 to 0.95. See Fig. 1-4; col. 1, line 30 – col. 6, line 70.

Regarding claim 2, Mizutani discloses a total power of 1.5 kW, thereby making it possible to achieve heating performance of 2000°C.

However, Mizutani does not disclose more than one mirror, an interfocal distance of 41.1 to 67 mm, or a major axis of 57.7 to 80 mm and a minor axis of 52 to 76 mm. It would have been obvious to one of ordinary skill in the art at the time of the invention to

include more than one mirror and to modify the distance between the two foci in order to change the heat irradiating the feed rod and seed crystal rod.

**2. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani et al. (US 3,817,710) in view of Mizutani et al. (US 3,761,677).**

3. Regarding claim 3, Mizutani '710 does not disclose bi-spheroid mirrors. However, Mizutani '677 discloses bi-spheroid mirrors (1, 1'). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to include bi-spheroid mirrors, such as suggested by Mizutani '677, to increase the reflecting surface.

4. Regarding claim 4, Mizutani '710 discloses an air-cooling unit (36) for introducing cooling gas for cooling the spheroid mirror, a heat source (21), and a flow rate of 2.5 L/s, or 0.15 m<sup>3</sup>/min. See col. 4, lines 13-17.

Regarding claim 6, Mizutani '710 discloses a cooling water heat exhaust system, where halogen lights (radiator) raise the temperature of the mirror, cooling water is supplied to cool to mirror, and cooling air is supplied by an exhaust pipe. See col. 4, lines 17-63.

However, Mizutani '710 does not disclose internal water-cooling jackets or heat insertion holes. Mizutani '677 discloses internal water-cooling jackets (61, 61') and heat insertion holes (4). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to include water-cooling jackets and heat insertion holes, such as suggested by Mizutani '677, to cool the spheroid mirrors and to insert the heating source, respectively. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the apparatus is capable of cooling the spheroid

Art Unit: 1722

mirrors at a flow rate of 1.2 to 2.3 m<sup>3</sup>/min. Lastly, it would have been obvious to one of ordinary skill in the art at the time of the invention that the air flow would become turbulent in the inner space of the spheroid mirrors when the air is flowing at a rate of 1.2 to 2.3 m<sup>3</sup>/min.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marissa W. Chaet whose telephone number is 571-272-8094. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra N. Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/588,510

Page 6

Art Unit: 1722

MWC

August 23, 2007

*/Robert Kunemund/  
Robert Kunemund  
Primary Patent Examiner  
TC 1700*